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<110> Wu, Shilan
Hayashi, Jon H.
Kinne, Lyle P.
Dierks, Peter M.

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Cys Val Val Leu Ala Leu Glu Glu His Leu Pro Asn Gly Asp Lys Thr
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 Ile Leu Ala Gln Asn Leu Glu Lys Thr Glu Ala Tyr Phe Leu Gly Ile
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Leu Asp Lys Ala Arg Glu Lys Pro Val Ala Phe Ala Val Arg Thr Asn
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Val Ser Tyr Asp Gly Thr Val Asp Asp Asp Ser Pro Val His Gly Ser
 65 70 75 80

Ala Ile Ser Phe Glu Val Arg Asp Phe Leu His Ile Lys Glu Lys Tyr
 85 90 95

Asp Asn Asn Trp Trp Ile Gly Arg Leu Val Lys Glu Gly Ser Asp Val
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Gly Phe Ile Pro Ser Pro Val Lys Leu Glu Ala Val Arg Ser Gly Leu
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Gly Ala Arg Arg Tyr Pro Arg Pro Ala Ser Ala Ala Pro His Ala Pro
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His Ala Pro Pro Leu Ser Arg Gly Ser Thr Pro Pro Thr Pro Gly Glu
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Glu Ser Asp Gly Ala Gly Arg Gly Arg Gly Gly Gly Ala Gly Gly Lys
 165 170 175

Glu Lys Arg Lys Pro Phe Phe Lys Lys Ala Glu Ala Ser Thr Pro Tyr
 180 185 190

Asp Val Val Pro Ser Met Arg Pro Val Val Ile Val Gly Pro Ser Leu
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 Lys Gly Tyr Glu Val Thr Asp Met Met Gln Lys Ala Leu Phe Asp Phe
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 Leu Lys Arg Arg Phe Glu Gly Arg Ile Ile Ile Thr Arg Val Met Ala
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 Asp Ile Ser Leu Ala Lys Arg Ser Leu Leu Asn Asn Pro Ser Lys Arg
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 Gln Ala Glu Ile Glu Arg Ile Phe Glu Leu Ala Arg Thr Leu Gln Leu
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 Thr Ser Leu Ala Pro Thr Ile Val Tyr Leu Lys Ile Ser Ser Pro Lys
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 Val Leu Gln Arg Leu Ile Lys Ser Arg Gly Lys Gly Gln Thr Lys Asn
 325 330 335
 Leu Ser Val Gln Met Val Ala Ala Glu Lys Leu Ala Gln Cys Pro Pro
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 Asp Met Phe Asp Val Ile Leu Asp Glu Asn Gln Leu Glu Asp Ala Cys
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 Glu His Ile Ala Glu Tyr Leu Glu Ala Tyr Trp Arg Ala Thr His Pro
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 Pro Val Pro Glu Glu Ala Ala Pro Ala Arg Pro Val Pro Arg Thr His
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 Asn Ala His Ala Met Pro Gly Gly Arg Ser Arg Ala Ala Arg Pro Glu
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 Arg Leu Glu Glu Glu Tyr Tyr Pro Arg Gly Glu Arg Cys Glu Arg Tyr
 420 425 430
 Glu Arg Gly Tyr Pro Arg Asp Tyr His Glu Tyr Gly Pro Glu Tyr Pro
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Arg Glu Arg Ala His Ala Ala His Ala Ala Ala Pro His Asp Ala Tyr
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Gly His Asp Tyr Thr Arg Asp Ala Tyr Ala Arg Glu Glu Tyr Gly Arg
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<213> *Heliothis virescens*

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 <213> *Heliothis virescens*

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Ile Lys Gln Leu Asp Lys Ala Arg Glu Lys Pro Val Ala Phe Ala Val
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Arg Thr Asn Val Ser Tyr Asp Gly Thr Val Asp Asp Asp Ser Pro Val
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His Gly Ser Ala Ile Ser Phe Glu Val Arg Asp Phe Leu His Ile Lys
 85 90 95

Glu Lys Tyr Asp Asn Asn Trp Trp Ile Gly Arg Leu Val Lys Glu Gly
 Page 26

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 His Ala Pro His Ala Pro Pro Leu Ser Arg Gly Ser Thr Pro Pro Thr
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 Pro Gly Glu Glu Ser Asp Gly Ala Gly Arg Gly Arg Gly Gly Gly Ala
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 Gly Gly Lys Glu Lys Arg Lys Pro Phe Phe Lys Lys Ala Glu Ala Ser
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 Thr Pro Tyr Asp Val Val Pro Ser Met Arg Pro Val Val Ile Val Gly
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 Pro Ser Leu Lys Gly Tyr Glu Val Thr Asp Met Met Gln Lys Ala Leu
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 Val Gln Ser Asp Ile Ser Leu Ala Lys Arg Thr Gln Asn Ala Pro Lys
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 Lys Pro Phe Val Glu Arg Ala Gly Asn Arg Thr Asn Cys Leu Ala Glu
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 Val Gln Ala Glu Ile Glu Arg Ile Phe Glu Leu Ala Arg Thr Leu Gln
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355

360

365

Cys Glu His Ile Ala Glu Tyr Leu Glu Ala Tyr Trp Arg Ala Thr His
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Pro Pro Val Pro Glu Glu Ala Ala Pro Ala Arg Pro Val Pro Arg Thr
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His Asn Ala His Ala Met Pro Gly Gly Arg Ser Arg Ala Ala Arg Pro
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Glu Arg Leu Glu Glu Glu Tyr Tyr Pro Arg Gly Glu Arg Cys Glu Arg
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Tyr Glu Arg Gly Tyr Pro Arg Asp Tyr His Glu Tyr Gly Pro Glu Tyr
 435 440 445

Pro Arg Glu Arg Ala His Ala Ala His Ala Ala Ala Pro His Asp Ala
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Tyr Gly His Asp Tyr Thr Arg Asp Ala Tyr Ala Arg Glu Glu Tyr Gly
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 <213> *Heliothis virescens*

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 <213> *Heliothis virescens*

<400> 12

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35 40 45

Glu Ala Gln Ala Ile Lys Gln Leu Asp Lys Ala Arg Glu Lys Pro Val
50 55 60

Ala Phe Ala Val Arg Thr Asn Val Ser Tyr Asp Gly Thr Val Asp Asp
65 70 75 80

Asp Ser Pro Val His Gly Ser Ala Ile Ser Phe Glu Val Arg Asp Phe
85 90 95

Leu His Ile Lys Glu Lys Tyr Asp Asn Asn Trp Trp Ile Gly Arg Leu
100 105 110

Val Lys Glu Gly Ser Asp Val Gly Phe Ile Pro Ser Pro Val Lys Leu
115 120 125

Glu Ala Val Arg Ser Gly Leu Gly Ala Arg Arg Tyr Pro Arg Pro Ala
130 135 140

Ser Ala Ala Pro His Ala Pro His Ala Pro Pro Leu Ser Arg Gly Ser
145 150 155 160

Thr Pro Pro Thr Pro Asp Val Pro Ser Phe Asp Arg Gly Glu Glu Ser
165 170 175

Asp Gly Ala Gly Arg Gly Arg Gly Gly Ala Gly Gly Lys Glu Lys
180 185 190

Arg Lys Pro Phe Phe Lys Lys Ala Glu Ala Ser Thr Pro Tyr Asp Val
195 200 205

Val Pro Ser Met Arg Pro Val Val Ile Val Gly Pro Ser Leu Lys Gly
210 215 220

Tyr Glu Val Thr Asp Met Met Gln Lys Ala Leu Phe Asp Phe Leu Lys
225 230 235 240

Arg Arg Phe Glu Gly Arg Ile Ile Ile Thr Arg Val Gln Ser Asp Ile
Page 30

245

250

255

Ser Leu Ala Lys Arg Thr Gln Asn Ala Pro Lys Lys Pro Phe Val Glu
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Arg Ala Gly Asn Arg Thr Asn Cys Leu Ala Glu Ala Glu Ile Glu Arg
 275 280 285

Ile Phe Glu Leu Ala Arg Thr Leu Gln Leu Val Val Leu Asp Cys Asp
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Thr Ile Asn His Pro Ser Gln Leu Ala Lys Thr Ser Leu Ala Pro Thr
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Ile Val Tyr Leu Lys Ile Ser Ser Pro Lys Val Leu Gln Arg Leu Ile
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Lys Ser Arg Gly Lys Gly Gln Thr Lys Asn Leu Ser Val Gln Met Val
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Ala Ala Glu Lys Leu Ala Gln Cys Pro Pro Asp Met Phe Asp Val Ile
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Leu Glu Ala Tyr Trp Arg Ala Thr His Pro Pro Val Pro Glu Glu Ala
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Ser Tyr Glu Arg Glu Arg Gly Gly Arg Ser Arg Ala Ala Arg Pro Glu
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Gly His Asp Tyr Thr Arg Asp Ala Tyr Ala Arg Glu Glu Tyr Gly Arg
 Page 31

500

505

510

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Cys Gly Glu Tyr Ile Thr Asn Arg Lys Ser Leu Gln Thr Lys Tyr Asn
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Asp Ser Phe Lys Ser Ala Gln Val Glu Ser Arg Asp Gly Glu Lys Leu
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Val Gln Ser Met Ser Asp Asp Ile Arg Ala Met Met Glu Leu Lys Ile
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Ser Ala Val Lys Arg Ile Val Glu Ala Ala Glu Asn Met Ala Phe Asp
100 105 110

Lys Gln Asn Glu Pro Val Pro Glu Asp Phe Gln Phe Tyr Asn Ser Lys
115 120 125

Glu Met Glu Glu Pro Trp Asp Glu Val Ser Ile Thr Thr Thr Pro Glu
Page 42

130

135

140

Thr Asp Phe Gly Gln Glu Ser Trp Ile Val Arg Pro Pro Ser Lys Asn
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Ala His Thr Gln Gln Asn Pro His Phe Ser Asn Ile Pro Val Asn Thr
 165 170 175

Asn Phe Ser Ser Val His Val Pro Thr Asn Val Tyr Ala Trp Ala Pro
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Glu Val Ile Lys Gly Ile His Trp Ser Glu Gly Leu Asp Thr His Phe
 195 200 205

Ile Asn Asn Tyr Gln Ser Asp Pro Thr Leu Ser Trp Gln Tyr Phe Gly
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Ser Ser Thr Gly Phe Met Arg His Tyr Pro Ala Leu Lys Trp Arg Ala
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Ala Ala Ala Ser Pro Lys Asp Val Ile Ile Leu Val Asp Arg Ser Gly
 260 265 270

Ser Met Thr Gly Gln Arg Arg Asp Ile Ala Lys His Val Val Thr Asn
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Ile Leu Asp Thr Leu Gly Asn Asn Asp Phe Val Asn Val Leu Thr Phe
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Ala Asp Thr Val Glu Glu Ile Val Pro Cys Phe Glu Asp Ser Leu Val
 305 310 315 320

Gln Ala Thr Leu Gly Asn Ile Arg Glu Leu Lys Leu Ala Met Asp Ser
 325 330 335

Phe Glu Thr Gln Glu Ile Ala Asn Phe Ser Ala Ala Leu Thr Arg Ala
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 355 360 365

Asn Gln Ala Ile Met Leu Val Thr Asp Gly Val Pro Tyr Asn Tyr Lys
 370 375 380

Glu Ile Phe Glu Lys Tyr Asn Trp Lys Tyr Glu Thr Pro Val Arg Val
 Page 43

385 390 395 400

Phe Thr Tyr Leu Ile Gly Arg Glu Val Lys Val Ala Asp Val Arg Glu
405 410 415

Val Lys Trp Met Ala Cys Ala Asn Arg Gly Phe Tyr Val His Leu Ser
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Thr Leu Ala Glu Val Arg Glu Arg Val Leu Glu His Val Asn Val Leu
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Pro Val Tyr Ala Asn Val Thr Asp Pro Lys Val Ala Asp Tyr Leu Trp
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Ala Leu Met Thr Pro Tyr Lys Ile Gly Val Asn Gly Tyr Ala Phe Ile
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595 600 605

Phe Gln Gln Ile Leu Lys Pro Ser Tyr Asn Ser Val Asp Met Ile Glu
610 615 620

Val Glu Leu Phe Asp Asp Asp Arg Gly Pro Arg Asn Phe Ser Lys Glu
625 630 635 640

Leu Thr Ala Leu Arg Lys Glu Ile Ile Asp Gln Lys Thr Gly Asn Lys
Page 44

645

650

655

Val Met Ser Val Lys Tyr His Leu Asp Asp Met Lys Arg Val Ser Arg
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Ala Lys Arg His Tyr Phe Trp Thr Gly Ile Ser Asp Ser Pro Phe Thr
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Pro Pro Thr Asp Asp Ile His Arg Leu Ser Leu Thr Ser Lys Asn Ile
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Phe Leu Ser Thr His Ser Gly Leu Thr Arg Trp Gln Thr His Pro Pro
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Lys Glu His Asp Asn Asp Lys Pro Asp Phe Gly Lys Gln Trp Pro Arg
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Ala Ile Glu Glu Val Trp Tyr Arg Arg Ala Val Glu Gln His Tyr Val
 Page 45

900

905

910

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Pro Leu Asn Val Ser Leu Ala Leu Val Thr Ala Ser His Ala Val Phe
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His Gly Asp Gly His Arg Lys Ala Pro Ala Ala Val Val Gly Phe Gln
 945 950 955 960

Phe Lys His Glu Arg Leu Ser Glu Trp Phe Asp Asn Ile Thr Ser Ser
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Cys Glu His Asn Lys Glu Cys Thr Thr Cys Gln Ser Asp Asn Trp Asp
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Cys Tyr Leu Val Asp Asn Asn Gly Trp Val Ile Val Ser Glu Asp Ser
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 1115 1120 1125

Glu Arg Asp Tyr Glu Lys Leu Val Leu Ile Asn Arg Thr Arg Pro
 1130 1135 1140

Thr Pro Cys Asp Arg Glu Met Tyr Leu Tyr Gln Leu Asp Tyr Asn
 Page 46

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Arg Thr Leu Gln Leu Val

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5

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Ala Gln Cys Pro Pro Asp Met

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Cys Asn Gln Ala Ile Met Ile Val Ser
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Pro Leu Thr Lys Val Ile Gly Leu Leu Pro Arg
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